REMARKS

An obvious error in the specification (see the table headings on page 23) has been corrected.

As a result of the foregoing amendments, claim 1 now corresponds to claim 5 without the recitation of the olefin having 2 to 6 carbon atoms. An obvious typographical error in the location of a dialkyl moiety has also been corrected in subpart (4) thereof. Claim 1 has further been amended to recited the result implicitly achieved by the process, namely the lack of precipitation (see page 20).

Claims made redundant by the changes to claim 1 have been cancelled and the dependency of other claims corrected as required. An obvious typographic error in claim 6 has been corrected and claim 8 has been revised to increase its clarity.

The claims after amendment were effectively being considered by the Examiner prior to the amendment and therefore, do not raise any new issues or require a new search.

The claims were rejected under 35 U.S.C. 103 over Mitsao in view of Kocal. This rejection is respectfully traversed.

The present invention involves a method of producing a polyalkylbiphenyls with high efficiency in a continuous flow system which includes recycling of a fraction of a reaction mixture. If the recycled fraction contains a biphenyl having a relatively low melting point, up to 70°C, and the biphenyl exists in a high concentration, it can become solidified during the recirculation. That problem is solved by maintaining the ratio of biphenyl to monoalkylbiphenyl at 0.1 or more and less than the soluablility of biphenyl to monoalkylbiphenyl at a circulation temperature.

The Office Action acknowledges on that Mitsao does not teach or suggest recycling a fraction of the biphenyl and monoalkylbiphenyl. Because of this acknowledgment of a lack of recycling, the additional statement that the reference does not "specifically mention" the concentration and amount of dialkyl biphenyls is, of course, true although it would be more accurate to say this is not taught or suggested. Further, the Office Action acknowledges the lack of a fixed bed reactor system in the reference.

The Office Action asserts, however, that it would be obvious to modify Mitsao using the claimed composition and mass percent using a recycled stream in order to reduce the heavy components and increase the desired components. No basis for this assertion is set forth nor is any apparent. The required factual basis for the rejection is absent and therefore, the Office Action has merely deemed what is not taught or suggested in the prior art to be obvious, which is not permitted. The "Response to Arguments" does not attempt to justify the motivation for recycling being reduction of heavy components and increasing desired components but instead relies on Kocal for that teaching. However, Mitsao uses a solid catalyst while Kocal uses a liquid catalyst and care is taken to maintain the catalyst in the liquid phase (column 3, lines 39-44). Accordingly, importing Kocal's recycle into Mitsao also requires importing the liquid form catalyst, and the resulting combination is quite different from the invention.

Even if Mitsao had a recycle step, and it does not, there is a problem with solidification if the biphenyl exists in a high concentration. The reference does not recognize this problem nor does it provide any solution to it. Further, 4,4'-dialkylbiphenyl has a high melting point and there is a fear that it will precipitate as a crystal when cooled. Dialkylbiphenyls having an ortho-position substituent have low boiling point and their inclusion is undesirable when using the product as a pressure

sensitive paper solid. There is no motivation to change the Mitsao process in order to address problems that the reference does not teach or suggest even exist.

Mitsao has an object of preparing 4-alkyl products with selectivity. It does not disclose a method for reducing the content of 4,4'-dialkylbiphenyls in the product. Mitsao Example 6-12 show proportions of 4,4'-disubstituted alkylbiphenyl in disubstituted dialkybiphenyls to be in the range of 79-88 percent and the amount in comparative examples 1-3 is 30-44 %, as noted by the Examiner. That should be contrasted with the invention. For instance, Example 1 shows a content of 4,4'-dialkylbiphenyl in the tower bottom fraction of 14.1%.

The present invention relies not merely in recycling a fraction of a reaction product to the reactor but to circulate a fraction having a specific composition separated from the reaction product back to the reactor which permits the advantageous effects described in the application. Two of the main advantageous results which are achieved as a result of the process set forth in amended claim 1 are:

A) polyalkylbiphenyls can be produced with high efficiency and without the inhibition to the operation which are caused by the precipitation of biphenyl in the circulation step, by limiting the ratio of biphenyl to monoalkylbiphenyls to be 0.1 or more and to be less than the solubility of the biphenyl to monoalkylbiphenyl at a circulation temperature; and

B) polyalkylbiphenyls, which were useful as a solvent for pressure sensitive paper solvents and in which the content of 4,4'-dialkybipehnyls which tend to crystallize out at low temperature is reduced, can be efficiently produced in high yield by limiting the concentration and amount of dialkylbiphenyls in the circulating fraction. As described on page 20 of the application, a large amount of the

dialkylbiphenyl precipitated in the case of a solution containing 30 mass percent while no precipitation was observed when the solution contained 15 mass percent.

In light of all of the foregoing considerations, it is respectfully submitted that this application is in condition to be allowed and the early issuance of a Notice of Allowance is respectfully solicited.

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Respectfully submitted,

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